

CLAIMS

1. A multisignal device being applicable to a rear-view mirror of a vehicle, said device being installed in the inside of a housing carrying the mirror, on a portion of said housing or on a lower housing cover and at least integrating a light source being fit to provide an intermittent signal projecting the light in the forward, sideward and rearward directions; characterized in that it includes two signaling units being arranged in a joint or separate arrangement, one of them comprising an array of light emitters being adapted to be progressively switched on and illuminating at the beginning to the front and infinite of the vehicle, and to which other light beams are combined in a fan-like arrangement until they illuminate a corridor on the side floor, said signaling unit comprising a light source at least for the intermittent light, being a concentrated supporting core which is included as an arrow tip and transversely penetrating through the cavity formed between the reflecting surface (2) and the transparent cover (1), so as to allow the light emitters to remain above the surface of the reflector (2), said core (Z) having conducting tracks printed in a circuit (7) on both sides or in two opposite circuits, being or not parallel, said sides being connected by at least an electrical bridge (52) where the light elements (4) and (4bis) are inserted; the light emitting direction of said elements of equal or different nature being in opposite directions, in the paths (x1) and (x3) or at least in (x1) from the same light core, which produce a partly direct light output to the rear or in the direction (F2) through the narrow corridor (8), the light output also being axially reflected to the front or in the direction (F1) inside the elongated cavity or collimator between the transparent surface (1) and the reflector (2).
2. A device as per claim 1, characterized in that for said signals the transparent or translucent element or elements it uses are colorless or slightly tinted in a fume, light blue, watery green, whitish or orange tint, among others, the device emitting at least a white light to the front in a direction (P1) for the first beam (B-C1) of the progressive signal and of a wave length of between 400 and 620 nanometers for the intermittent signal covering the rearward oriented area (F2) taking as a reference a 60° angle to be covered outside the vehicle as from the running axis taken as a 0° reference.

3. A device as per claim 1, characterized in that it has a rearwardly oriented light outlet being a path (8) between the surface of the transparent cover (1) and the reflector (2) being normally metalized or of another color and having a concave, tube-shaped bottom (M), the light exiting at the end through a zone (9) being delimited by two adjacent surfaces (41) and (42) where the increased difference between said surfaces produces a solid passage for the light and incorporating a series of microprisms in order to give a better definition to the passage of the light through it and to prevent the light from being directly visible for the eyes of the driver of the vehicle.

4. A device as per claim 1, characterized in that in order to prevent the steaming up and the condensation it incorporates a second transparent plate (30) being thinner than the outside transparent cover (1), an air chamber (31) being created by a gap of at least 0.1 mm between said transparent cover and plate, this latter being gripped around the whole perimeter between the transparent cover (1) and the reflector (2), this latter being in part possibly provided with prisms, microlenses or a diffusing engraving, the device being atmospherically linked in order to thus balance the temperature through at least one orifice (32), the system being completed by an external orifice (17) and/or the dissipating fins (16), and/or a metal plate being close to the ventilated source or core (20) and/or a second circuit separating the resistive circuit from the source, a thermal film being alternatively applied instead of the surface (30) which is made of a material having a heat conduction being different from that of the transparent cover (1) and being provided with manometrically operating microflutes and thus repelling the water and the condensation.

5. A device as per claim 1, characterized in that the transparent cover offers a crystalline, shadowless perimeter (1-A) as from the boundary (L) with a width of 10 mm in a great part of its extension, said crystalline vision band (VC) consisting in hiding the weld edge underneath the housing edge, the surfaces (1-A) and (1-B) respectively being the external and the internal one being related to each other as 2 surfaces that are as parallel, flat and smooth as possible, (1-B) at utmost having an inclination of less than 40° with respect to (1-A), and if (1-B) is curved this condition is satisfied by its tangent at a middle point of said 10 mm.

6. A device as per claim 1, characterized in that said devices being arranged in a joint or separate arrangement achieve a crystalline, shadowless perimeter by applying a cut at the perimeter (L) of the opening of the housing or portion containing them even if said originally preformed opening did not exist, with a cut by laser beam being programmed with temperatures between 1,500 and more than 20,000 degrees centigrade or by means of a water jet being at a high pressure of more than 100 bar, this allowing to fit at least a portion in the inside with a higher accuracy for a standard piece being external to the rear-view mirror by means of a double-faced adhesive perimeter (K) besides making up a joint against the aerodynamic noise and/or with screws and/or clamps.

7. A device as per claim 1, characterized in that said light-emitting core with its paths is painted in any color being similar to that of the reflector and is covered by a protuberant portion of said reflector (3) having axial orifices through which the light exits in the lateral directions (x1) and (x3) and/or frontal orifices (44) of any shape for ventilation and extra light exit in the direction (x2), and/or is covered only by a machined area (80) with inner microprisms, concavities of a hemicylinder type, machining, lenses or a diffusing engraving at the transparent cover (1) or (30) of at least 10 mm before and after the intersection of said transparent cover and the tip of the core or circuit.

8. A device as per claim 1, characterized in that the light-emitting core (Z), according to the desired light angle, is a sandwich of at least two circuits being interconnected by bridges (52) or tubes being printed by deposition or connecting cables, plates or rivets, said at least two circuits being fixed or adhered to a preformed core being made of a material having a high heat-conducting power, said preformed core being provided with longitudinal perforations allowing the air circulation, the resulting external faces of the light source module being parallel or nonparallel and deviating from an axis between 0° and $\pm 90^{\circ}$ as from a lower or upper angular point (XL) up to being a plane or circuit (7A), said faces carrying the light-emitting elements of the same or different nature on at least one of said external faces (25).

9. A device as per claim 1 or 8, characterized in that on the light-emitting core (Z) the circuit paths are printed by any deposition, stamping or adhesive process even directly on the radiating body of the core (20), or else they are

made of die-cut, bent and fixed sheet enveloping said core (20) in case of this latter being a molded piece with the opposite faces arranged with the desired spacing, inclination and shape (Fig. 11-C), or else they can have a base (81) in order to thus be stably fixed to a second circuit such as the resistive protection one, flat or sheet-shaped cable or supporting base circuit.

10 A device as per claim 1 or 8, characterized in that at its base (81) the core is provided with insertion and plug-in paths (83) allowing to connect it to a second circuit in its turn consisting of press-formed and die-cut plate paths (82) in order to thus insert, hold and grip one or several cores having the same or different configurations as per a repetitively modular shape, with the light exiting from one or more faces, said core being laterally shiftable in a parallel connection on said paths of the second supporting circuit.

11. A device as per claim 1 or 8, characterized in that the light-emitting core (Z) has nonparallel, opposite and spaced faces, and it also has a third face facing the front with a light-emitting element (5) being operable to emit light in the direction (x2), said frontal face or circuit being also able to house a camera of any type with its interface.

12. A device as per claim 1 or 8, characterized in that at their circuits or paths the cores are prepared for a combined insertion of light-emitting elements of the same or different nature and provided with optics of any kind, such as LED's, PCB circuits with a chip LED array or multichip encapsulated LED's, with weld paths being adjacent to the cathode points (C) of said elements having at least for one cathode a minimum surface of irregular shape of 10 mm^2 .

13. A device as per claim 1 or 8, characterized in that at the light-emitting core (Z) the body (20) is metallic and electroconductive and is connected to the paths through said bridges (52) so as to thus enhance the conduction of heat to an element having a bigger metallic mass, this connectivity being to the same pole connecting with the cathodes of the different light-emitting elements.

14. A device as per claim 1 or 8, characterized in that the light-emitting core (Z) is fixed and held by studs or clamps (22) onto a support cover of the circuit (50) or (50A) or between said cover and the reflector or fixed to the reflector or to the transparent cover or gripped between at least two of those parts and/or

fitted to another circuit by means of a stable base (81) in order to thus keep the resistor circuit (21) at a distance from the light-emitting portion (4) with the possibility of inserting several cores into a base.

15. A device as per claim 1 or 14, characterized in that said supporting cover
 5 having an upper or inclined shape is made of a material having a high heat-conducting power such as polycarbonate with filler, resin, ceramic, polyamides or metal and is provided with fins (16) for dissipating the heat, and furthermore provides a guide for the air circulation through at least one orifice (17) or (17A), said orifices being located at said cover or in some internal portion of the device
 10 or between the parts, the internal chambers of the reflectors (2), the passage (8) and the chamber (31) between transparent plates being thus atmospherically balanced, the cover having an almost flat joining perimeter and being fixed by a clamp, a welded joint or screws to the inside of the reflector body (2), or else it can be the actual reflector body or an inner housing body of
 15 the device.

16. A device as per claim 1, characterized in that at least one of the reflecting surfaces for any of the signals is an axial collimator or reflector having an elongated surface with the shape of an elongated, stepped parabola being almost parallel to the surface of the transparent cover with micromirrors being
 20 arranged like the slats of a jalousie reflecting the light towards the front and thus establishing a light path based on the light along the path (x3) and/or (x1).

17. A device as per claim 1, characterized in that as a variant it projects the light in the rearward direction (F2) from a concentrated, flat core (7A) through the passage (8) by means of a retroreflector (40) or (S1) being part of the
 25 reflector piece (2) or separate from it and consisting in a flat micromirror being slightly curved or parabolic and inclined at a 45° angle within +/-30° with respect to the initial mayor axis (x) of the light-emitting element (4) and being applied in an interposed arrangement between said light emitting element and the transparent cover thus producing a deviation of the light close to 90° or along
 30 the path (x1) towards (F2).

18. A device as per claims 1 and 17, characterized in that as a variant it projects the light in the rearward direction (F2) from a flat core (7bis) by means

of a transparent optical reflector (R) or prismatic body having a light receiving surface (P) in the vicinity of the light-emitting element (4) as per a normal to the initial light path (x), the light being reflected on the inner surface being smooth or provided with micropisms (S1) with an inclination of about 45° being variable
 5 within $\pm 30^\circ$, where part of the light is bifurcated and follows the path (x2) by transparency, and the other part follows the path (x1) at 90° with respect to the initial path (x) towards the focus (F2), said prismatic body extending as much as necessary towards the outlet surface (E) and having in its path a middle inner surface (M) with a number of reflecting surfaces or inner collimator with a
 10 curved, half-tube-shaped bottom.

19. A device as per claims 1 and 17, characterized in that as a variant it projects the light in the rearward direction (F2) from a concentrated core being a bulb lamp (45) being tinted or masked in order to produce the color light, this latter being reflected on a cover (48) consisting in a separate, heat-resistant
 15 piece of metalized polycarbonate or metal having more or less the shape of a "T" or "Y" with outspread flanges, the reflecting surfaces being smooth, flat, parabolic or provided with micromirrors and inclined at 45° with respect to the beams being emitted by said bulb lamp in order to thus orient the light at 90° at least in one direction towards (F2) with respect to the path being normal to the
 20 transparent cover (1) or focal center that said bulb lamp would have towards the outside of the device.

20. A device as per claims 1, 17, 18 and 19, where the reflectors and cores are commonly characterized in that they are or are not separate elements, this allowing:

25 A - them to be fixed to the surface (1) or (30) or to the reflector or inner body (2) by means of clamps, press-fitting, gluing, hotstamping, ultrasound or other thermal means;

B - them to be shifted without redesigning the device in order to thus obtain an accurate adjustment of the light exit in the desired direction (x1) or
 30 (x3);

C - to avoid the dark zone in the direction (x2) by means of holes in the retroreflector (44) separating the surfaces (S1), the flanges or the faces of the

circuits of the core (20), and to include between both a light-emitting element (5) emitting light towards (x2);

D - to have another similar, symmetric and opposite element in order to project the light towards the collimator or zone (F1); and

5 E - them to form an integrating part of some of the pieces of the device such as the reflector (2) for the mirror (40) or the transparent plates (1) or (30) for the body (R) or the core (20) as a module being inserted into another circuit or base.

21. A device as per claim 1, characterized in that the progressive function (B-C1) is a light beam being in a position to be permanently switched on and
10 visible at the front in white color, said light beams serving the purpose of determining two lighted paths at the sides of the vehicle from an infinitely remote location up to the lateral ground in the vicinity and distinguishing the width and presence of said vehicle as seen at the front, said light beams by
15 means of the light source (4) and (5) providing an illumination towards a focus (P1) at the front coinciding with the running axis at 0°, the intensity of that focus being higher than that of the rest of the area being lighted by the same function and higher than 1 candela, for the remaining area said intensity being higher than 0.01 candela within a horizontal extension spanning from +80° towards the
20 outside up to +45° towards the inside and vertically a minimum of +/-15° from a 0° plane coinciding with the focal center, the remaining vertical beams of the device (B-C 2 + B-C 3 + B-C 4) progressively merging till lighting a path at the sides, said remaining vertical beams possibly being of other colors such as yellow, blue or green.

22. A device as per claim 1, characterized in that the lighting functions of the vehicle and their controls are connected to a general circuit of the vehicle and include the turning signal and/or the complementary illumination of the camera (100) and/or the frontal light (B-C) whose beams are in a position to be progressively added or removed, said lighting functions being in a position to be
25 automatically actuated with other lights of the vehicle and/or the centralized locking system by means of the remote control, the operation of the camera and/or the connection of a safety and alarm system, and/or indirectly as comfort
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and safety lights together with interior lights of the passengers cabin or the trunk, and/or with the opening of the motor compartment or the doors, and/or they will be voluntarily actuated in a separate manner as regards the remaining lighting functions of the vehicle.

5 23. A device as per claim 1, characterized in that the progressive function (B-
C) is controlled by means of an information bus or driver automatically
connecting or disconnecting it when detecting any change in the direction of the
wheels and/or in synchronism with a given speed and/or with a given gear being
10 used, in order to thus facilitate the parking maneuvers, and/or by rain or
darkness sensors.

24. A device as per claim 1, characterized in that the progressive function (B-
C) is connected or disconnected with an interposed actuation of the voluntary or
automatic controls of an own attenuator or dimmer (D) being fit to progressively
increase or reduce its light intensity.

15 25. A device as per claims 1 through 23 which by employing the techniques
characterizing the light-emitting core (Z) and/or its reflective versions and/or the
progressive beam function including the horizontal shape can be adapted to
different luminaires and lighting fixtures in the home and industry or in other
parts of the vehicles or to other vehicles.